SOM-4780

Intel Core Duo/Solo/Celeron M Processor SOM-XTX Module with CPU, LVDS, Audio, LAN & PCIe

User Manual

Copyright

The documentation and the software included with this product are copyrighted 2006 by Advantech Co., Ltd. All rights are reserved. Advantech Co., Ltd. reserves the right to make improvements in the products described in this manual at any time without notice. No part of this manual may be reproduced, copied, translated or transmitted in any form or by any means without the prior written permission of Advantech Co., Ltd. Information provided in this manual is intended to be accurate and reliable. However, Advantech Co., Ltd. assumes no responsibility for its use, nor for any infringements of the rights of third parties, which may result from its use.

Acknowledgements

SOM and DTOS are trademarks of Advantech Co., Ltd.
AMD is a trademark of Advanced Micro Devices, Inc.
Award is a trademark of Award Software International, Inc.
Cyrix is a trademark of Cyrix Corporation.
IBM, PC/AT, PS/2 and VGA are trademarks of International Business Machines Corporation.
Intel and Pentium are trademarks of Intel Corporation.
Microsoft Windows is a registered trademark of Microsoft Corp.
RTL is a trademark of Realtek Semiconductor Co., Ltd.
C&T is a trademark of Chips and Technologies, Inc.
UMC is a trademark of United Microelectronics Corporation.
Winbond is a trademark of Winbond Electronics Corp.
STPC is a trademark of SGS Thomson Corp.

For more information on this and other Advantech products, please visit our website at: **http://www.advantech.com**
For technical support and service, please visit our support website at: **http://support.advantech.com**

This manual is for the SOM-4780.

Part No. 2006578200 Edition 1
Printed in Taiwan Aug 2007

Declaration of Conformity

CE

This product has passed the CE test for environmental specifications. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

FCC Class A

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Caution! *There is a danger of a new battery exploding if it is incorrectly installed. Do not attempt to recharge, force open, or heat the battery.Replace the battery only with the same or equivalent type recommended by the manufacturer.Discard used batteries according to the manufacturer' s instructions.*

Technical Support and Assistance

1. Visit the Advantech web site at www.advantech.com where you can find the latest information about the product.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
   - Product name and serial number
   - Description of your peripheral attachments
   - Description of your software (operating system, version, application software, etc.)
   - A complete description of the problem
   - The exact wording of any error messages

Document Feedback

To assist us in making improvements to this manual, we would welcome comments and constructive criticism. Please send all such in writing to: support@advantech.com

Packing List

Before you begin installing your card, please make sure that the following materials have been shipped:

- SOM-4780 System On Module CPU module
- CD-ROM or Disks for utility, drivers, and manual (in PDF format)
- Heatspreader

If any of these items are missing or damaged, contact your distributor or sales representative immediately.

Safety Instructions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. DO NOT COVER THE OPENINGS.
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If one of the following situations arises, get the equipment checked by service personnel:
    - The power cord or plug is damaged.
    - Liquid has penetrated into the equipment.
    - The equipment has been exposed to moisture.
    - The equipment does not work well, or you cannot get it to work according to the user's manual.
    - The equipment has been dropped and damaged.
    - The equipment has obvious signs of breakage.

Safety Precaution - Static Electricity

Follow these simple precautions to protect yourself from harm and the products from damage.

1. To avoid electrical shock, always disconnect the power from your PC chassis before you work on it. Don't touch any components on the CPU card or other cards while the PC is on.
2. Disconnect power before making any configuration changes. The sudden rush of power as you connect a jumper or install a card may damage sensitive electronic components.

Contents

Chapter 1 General Information 2

1.1 Introduction 2

1.2 Specifications 3

1.2.1 Standard System On Module functions 3

1.2.2 VGA Flat Panel Interface 4

1.2.3 Audio Function 4

1.2.4 Ethernet 4

1.2.5 Mechanical and Environmental 4

Chapter 2 Mechanical Information 8

2.1 Board Connector 8

Figure 2.1 SOM-4780 Locating Connectors 8

2.2 Board Mechanical Drawing 9

2.2.1 Front Side 9

Figure 2.2 SOM-4780 Front Side Drawing 9

2.2.2 Rear Side 9

Figure 2.3 SOM-4780 Rear Side Drawing 9

2.3 Heatspreader Mechanical Drawing 10

2.3.1 Drawing of Heatspreader For BGA Type CPU 10

Figure 2.4 Heatspreader Drawing For BGA Type CPUs 10

2.3.2 Drawing of Heatspreader For Socket Type CPU 10

Figure 2.5 Heatspreader Drawing For Socket Type CPU 10

Chapter 3 BIOS Setup Information 12

3.1 Introduction 12

3.2 Safety Precautions 12

3.3 BIOS Update 13

3.4 Basic BIOS Setup 13

3.4.1 Enter the BIOS Setup Screen 14

Figure 3.1 BIOS setup screen 14

3.4.2 Main Setup Item 14

Chapter 4 Driver Installation 18

4.1 Driver Introduction 18

4.2 Driver Installation 19

4.2.1 Step 1- Install Intel RAID Disk Driver 19

4.2.2 Step 2- Install Intel INF Update Driver 21

4.2.3 Step 3- Install Intel Graphic Driver 21

4.2.4 Step 4- Install Audio Driver 22

4.2.5 Step 5- Install Intel Ethernet Driver 22

4.2.6 Step 6- Install Intel Storage Driver 23
Appendix A Watchdog Timer.....26
A.1 Programming the Watchdog Timer..... 26
Appendix B System Assignments 30
B.1 System I/O Ports..... 30
Table B.1 System I/O Ports..... 30
B.2 DMA Channel Assignments 31
Table B.2 DMA Channel Assignments..... 31
B.3 Interrupt Assignments..... 31
Table B.3 Interrupt Assignments..... 31
B.4 1st MB Memory Map 32
Table B.4 1st MB Memory Map 32
Appendix C SDVO Function and FAN Pin Assignment..34
C.1 SDVO Function and FAN Pin Assignment 34
Table C.1 SDVO Connector..... 34
Table C.2 FAN Connector..... 35

CHAPTER 1

General Information

This chapter gives background information on the SOM-4780 CPU System on Module.

Sections include:

- Introduction
- Specification

Chapter 1 General Information

1.1 Introduction

SOM-4780 is the first Intel solution for Advantech's SOM-XTX product line, and is powered by the Intel dual core platform 945GM chipset. With the Intel Core Duo or Core 2 Duo processor, it can provide far higher performance than previous generation Pentium M processors due to their multi-core architectures.

The Intel 945GM mobile chipset supports Intel's new generation of low power consumption processors that bring many new integrated functions to the customer. Intel's new generation Core 2 Duo CPU brings multi-core processing power to applications that can increase system performance by up to 50%. Besides the new dual core architecture, the Intel 945 chipset also integrates a new generation 3D graphic engine and provides higher graphic performance for heavy display applications, especially beneficial for the demands of High Definition (HD) video content in the future.

DDR2 memory provides lower power consumption than DDR memory but high speed data transmit rates, making SOM-4780 able to process more data in a shorter time than other platforms, SATA and USB 2.0 functions also provide new generation connection for higher transfers between the system and storage devices.

SOM-4780 complies with the "Green Function" standard and supports Doze, Standby and Suspend modes. The small size (95 mm x 114 mm) uses four high capacity connectors based on the proven SOM-XTX form factor, this allows SOM-XTX modules to be easily and securely mounted onto a customized solution board.

SOM-XTX is a standard CPU module with all main components onboard, it integrates into the customer's own carrier board via 4 connectors. Customers can make the necessary design specifications on their carrier board based on different application demands. PCI Express, PCI interface, 6 x USB ports, 2 SATA and 2 COM ports are provided, SOM-XTX provides high flexibility to meet many different application requirements.

1.2 Specifications

1.2.1 Standard System On Module functions

- CPU:

  Support Intel Core 2 Duo socket type processer up to T7400 or Intel Core Duo socket type processer up to T2500

  On board Intel Core 2 Duo LV L7400 processor at 1.5 GHz

  On board Intel Core Duo LV L2400 processor at 1.66 GHz

  On board Intel Core Duo LV U2500 processor at 1.2 GHz

  On board Intel Celeron M ULV 423 processor at 1.06 GHz

  (Detail CPU support information please contact your sales representative)

- BIOS:

  Award 4 MB Flash BIOS

- Chipset:

  Intel 945GM Chipset 533 MHz FSB

- Cache memory:

  Integrated L2 cache depending on CPU

- System memory:

  1 x 200 pin SODIMM sockets, Double Data Rate 2 (DDR2) 128 MB to 1 GB, DDR2 400/533 MHz

- Power management:

  Supports power saving modes including Normal / Standby / Suspend modes. ACPI 2.0 compliant

- Enhanced IDE interface:

  1 EIDE channel for two devices. BIOS auto-detect up to UDMA-100

- SATA interface:

  2 SATA-150 Channels for two SATA devices

- Watchdog timer:

  255 levels timer interval, from 1 to 255 sec. or min setup by software, jumper less selection, generates system reset

- USB interface:

  Support 6 USB 2.0 ports

- Expansion Interface:

- Supports PCI Express - 1 x 4 ports
- Support PCI interface for 4 slots

1.2.2 VGA Flat Panel Interface

- Chipset:

  Intel 945GM integrated 2D/3D graphic controller
- Frame buffer:

  Supports Intel DVMT (Dynamic Video Memory Technology) 3.0

  1MB or 8MB under system BIOS

  Dynamic graphic memory under Windows
- Display type:
  - Simultaneously supports CRT / LCD displays.
  - Dual-view supports CRT / LCD displays
  - Supports 36/18-bit LVDS TFT LCD
- SDVO interface:

  Provides two SDVO interface (SDVO B and SDVO C) for connecting to DVI or LVDS transmitted chip for extra display
- Display mode:
  - CRT Mode: Supports up to 1600 x 1200 at 32 bit color
  - LCD Mode: Supports up to 1024 x 768 at 18 bit color

1.2.3 Audio Function

- Audio interface:

  Supports AC'97 audio codec with Line In, Line Out and MIC In. or High Definition Audio interface

1.2.4 Ethernet

- Chipset:

  10/100Mbps: Intel ICH7M + 82562 Controller. Based on IEEE 10BASE-T and 100BAS-T-TX standard

1.2.5 Mechanical and Environmental

- Dimensions:

  SOM-XTX form-factor, 114 mm x 95 mm (4.5" x 3.74")
- Power supply voltage:

  +5 V power only
- Power requirement:
  - Intel Core 2 Duo T7400: 6.5A @ 5V

  - Intel Core 2 Duo L7400: 4.58 A @5 V
  - Intel Core 2 Duo U2500: 3.39 A @ 5 V
  - Intel Celeron M ULV 423: 2.96 A @5 V
- Operating temperature:
  0 ~ 60° C (32 ~ 140° F)
- Operating humidity:
  0% ~ 90% relative humidity, non-condensing
- Weight:
  0.103 Kg (weight of total package)

CHAPTER 2

Mechanical Information

This chapter gives mechanical and connector information on the SOM-4780 CPU System on Module.

Sections include:

- Connector Information
- Mechanical Drawing

Chapter 2 Mechanical Information

2.1 Board Connector

There are four connectors at the rear side of SOM-4780 for connecting to the carrier board.

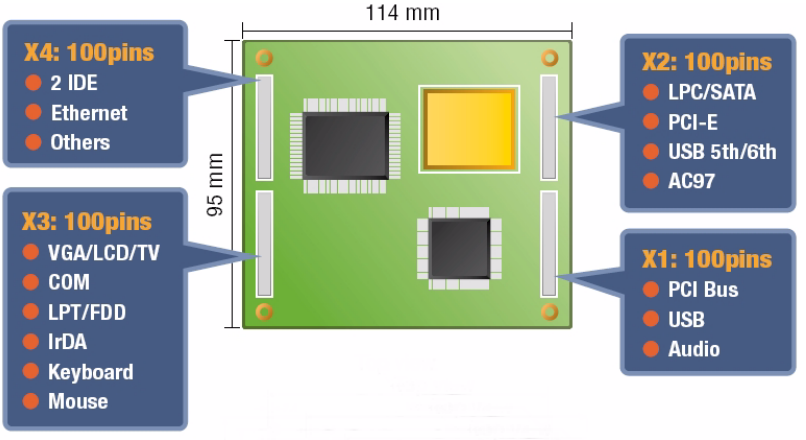


Figure 2.1: SOM-4780 Locating Connectors

Pin Assignments for X1/2/3/4 connectors

Please refer to Advantech SOM-XTX Design Guide.

2.2 Board Mechanical Drawing

2.2.1 Front Side

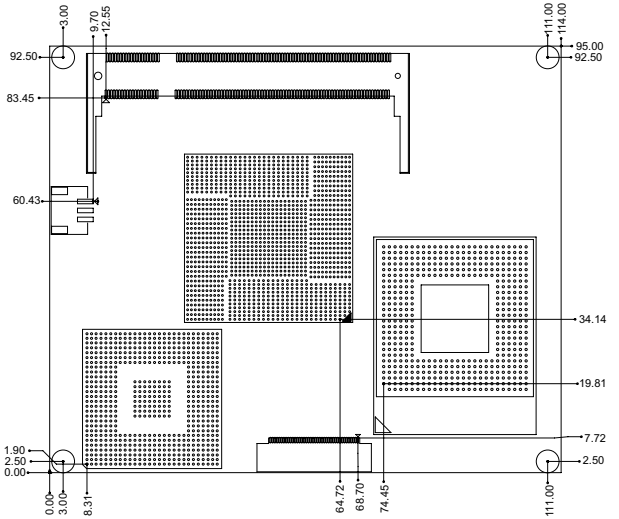


Figure 2.2: SOM-4780 Front Side Drawing

2.2.2 Rear Side

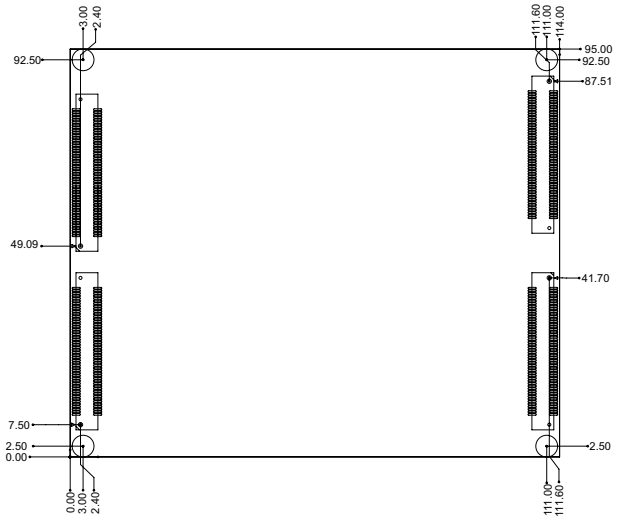


Figure 2.3: SOM-4780 Rear Side Drawing

2.3 Heatspreader Mechanical Drawing

2.3.1 Drawing of Heatspreader For BGA Type CPU

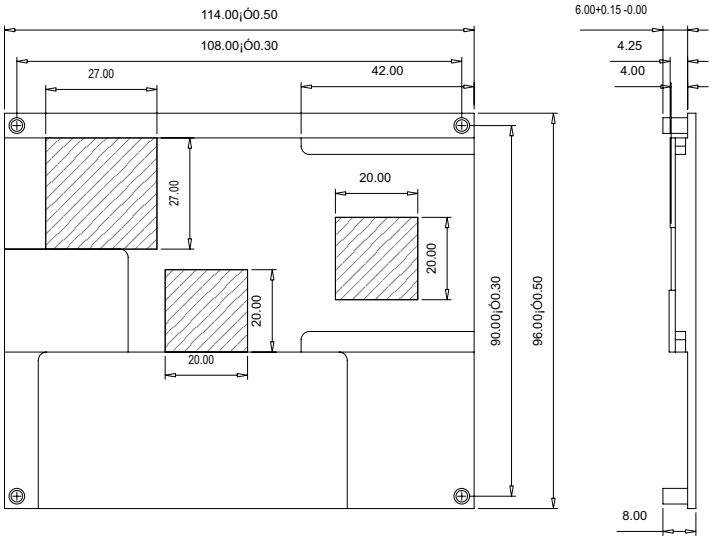


Figure 2.4: Heatspreader Drawing For BGA Type CPUs

2.3.2 Drawing of Heatspreader For Socket Type CPU

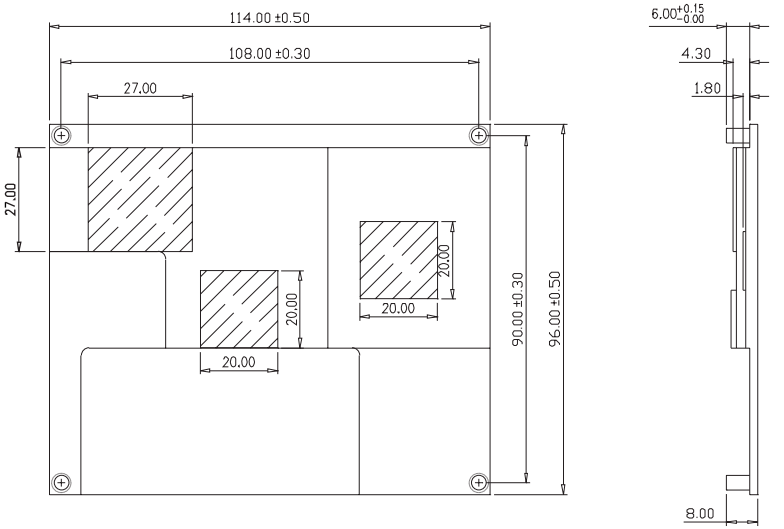


Figure 2.5: Heatspreader Drawing For Socket Type CPU

CHAPTER 3

BIOS Setup Information

This chapter gives basic BIOS upgrade and Setup information on the SOM-4780 CPU System on Module.

Sections include:

- Safety Precautions
- BIOS Update
- Basic BIOS Setup

Chapter 3 BIOS Setup Information

3.1 Introduction

The SOM-4780 system BIOS is located in Flash ROM device. A Single Flash chip holds the system BIOS, VGA BIOS and network Boot ROM (optional). This method minimizes the number of chips and difficulty of configuration.

3.2 Safety Precautions

Warning! *Always completely disconnect the power cord from your board whenever you are working on it. Do not make connections while the power is on, because sensitive electronic components can be damaged by a sudden rush of power.*

Caution! *Always ground yourself to remove any static charge before touching the board. Modern electronic devices are very sensitive to static electric charges. Use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag when they are not in use.*

3.3 BIOS Update

SOM-4780 is supplied with a software utility on the CD-ROM. It contains the files necessary for updating the BIOS. If you cannot find the following files, visit Advantech's website at www.advantech.com to download them or contact our technical support for help.

There are two files required for updating the BIOS.

AWDFLASH.EXE

This program allows you to update the BIOS Flash ROM.

4780V110.BIN (Example)

This binary file contains the system BIOS.

Follow the process below to complete the BIOS update.

1. Power up the SOM-4780. Make sure that the AWDFLASH.EXE and *.BIN files are located in the working drive.

Note: *Make sure that you do not run AWDFLASH.EXE while your system is operating in EMM386 mode.*

2. At the prompt, type **AWDFLASH.EXE** and press <Enter>. The BIOS configuration program will then display the following:
3. At the prompt, type in the BIN file. When you are sure that you have entered the file name correctly press <Enter>. The screen will ask "Do you want to save?" If you wish to continue press Y. If you change your mind or have made a mistake press N.
4. If you decide to continue, the screen will issue a prompt which will then ask "Are you sure to run the program (Y/N)?" If you wish to continue, press Y. Press N to exit the program. The new BIOS configuration will then write to the ROM BIOS chip.

3.4 Basic BIOS Setup

Award's BIOS ROM has a built-in Setup program that allows users to modify the basic system configuration. This type of information is stored in battery-backed CMOS RAM so that it retains the Setup information when the power is turned off.

Note: *Please do not change the setting unless the default value does not meet your requirement. Inappropriately reconfigured BIOS settings may cause the system to become unstable. If the system becomes unstable. Please load the default values to ensure system stability.*

3.4.1 Enter the BIOS Setup Screen

Power on the system and click <Del> key under the BIOS post screen, below BIOS setup screen will show up.

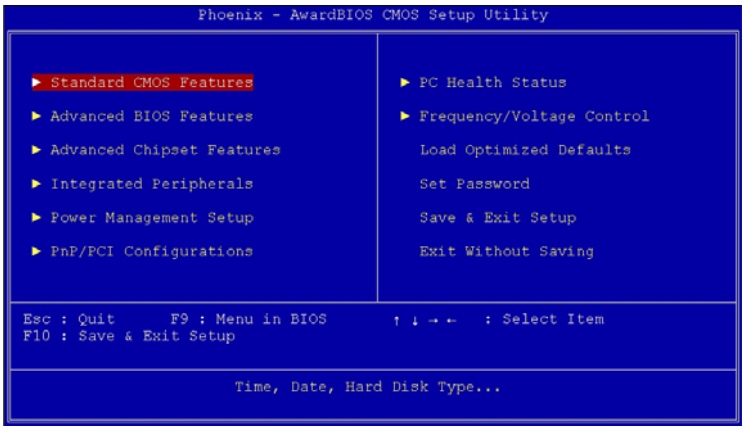


Figure 3.1: BIOS setup screen

Press " ← → ↑ ↓ " arrow keys to select the item you would like to change. Press the "Enter" key to enter the sub-screen.

3.4.2 Main Setup Item

Standard CMOS Features

This item allows the user to change the basic BIOS setting such as System Date, Time, FDD.

Advanced BIOS Features

This item allows the user to change the CPU and boot devices.

Advanced Chipset Features

This item allows the user to change the chipset and memory setting.

Integrated Peripherals

This item allows the user to change the Integrated Peripherals setting such as HDD, on board LAN, USB...

Power Management Setup

This item allows the user to change the system power management items, such as ACPI functions.

PnP/PCI Configurations

This item allows the user to change the Plug and Play and PCI resource setting, such as IRQ for VGA and USB.

PC Health Status

This item allows the user to monitor the system such as CPU, system temperature and voltage.

Frequency / Voltage Control

This item allows the user to change frequency of the CPU.

Load Optimized Default

This item allows the user to load the optimized BIOS setting to achieve the best performance.

Set Password

This item allows the user to set Supervisor/User Passwords.

Save & Exit Setup

This item help to save BIOS changes you made and exit the setup screen.

Exit Without Saving

This item exit the BIOS setup screen without saving any changes the user made.

CHAPTER 4

Driver Installation

This chapter gives you the driver installation information on the SOM-4780 CPU System on Module.

Sections include:

- Driver Information
- Driver Installation

Chapter 4 Driver Installation

4.1 Driver Introduction

The CD that shipped with SOM-4780 should contain the following drivers, please follow the sequence to complete the driver installation.

Step 1:

Install Intel RAID Disk Driver

(This Step is required before installing Microsoft Windows)

Step 2:

Install Intel INF Update Driver

Step 3:

Install Intel Graphic Driver

Step 4:

Install Audio Driver

Step 5:

Install Intel Ethernet Driver

Step 6:

Install Intel Storage Driver

Note: *For Windows XP Embedded, Windows CE 5.0 and Linux support, please contact a sales representative or technical person.*

Note: *Downloading the update for Windows XP or Windows 2000 may be required for enabling USB 2.0 function. More details from the web link.*

http://www.microsoft.com/whdc/system/bus/USB/USB2support.mspx

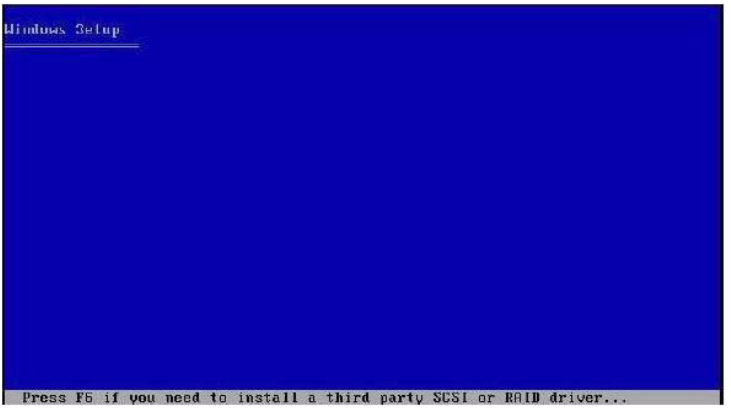
4.2 Driver Installation

Insert the SOM-4780 CD into the CD-ROM device, and follow the installation process from Step 1 to Step 6.

4.2.1 Step 1- Install Intel RAID Disk Driver

Windows 2000, XP 32bit / Vista 32bit

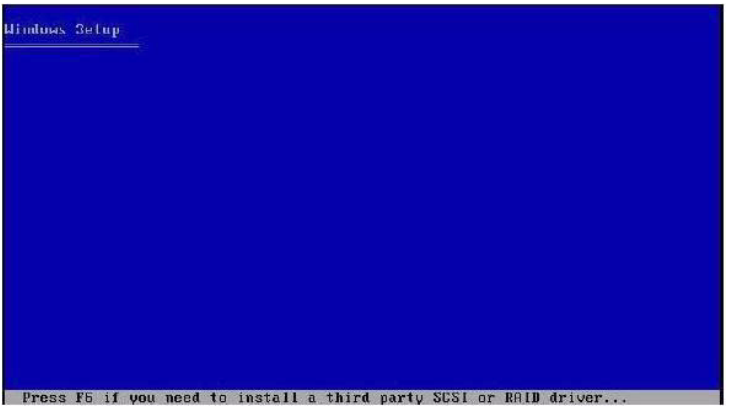
1. To install the Intel RAID Disk Driver, you need to make a utility floppy disk before installing Microsoft Windows on SOM-4780, please make this floppy disk on another Windows PC.
2. Click on the "Storage" folder and double click the "**F6flpy32.exe**" file and the system will ask for a floppy to be inserted to make the utility floppy disk just follow the instructions.
3. Insert the floppy utility disk and start to install Microsoft Windows on SOM-4780 then press "**F6**" to install the Intel RAID Disk Driver.



4. At the prompt, press "S" to select the RAID driver.
5. Follow the instructions and complete RAID driver installation.

Windows XP 64bit / Vista 64bit

1. To install the Intel RAID Disk Driver, you need to make a utility floppy disk before installing Microsoft Windows on SOM-4780, please make this floppy disk on another Windows PC.
2. Click on the "Storage" folder and double click the "**F6flpy64.exe**" file and the system will ask for a floppy to be inserted, just follow the instructions.
3. Insert the floppy utility disk and start to install Microsoft Windows on SOM-4780 then press "**F6**" to install the Intel RAID Disk Driver.



4. At the prompt, press "S" to select the RAID driver.
5. Follow the instructions to complete the RAID driver installation.

4.2.2 Step 2- Install Intel INF Update Driver

Windows 2000, XP 32bit

1. Click on the "**Chipset/Win 2K,XP 32bit**" folder and double click the "***.exe**" file.
2. Follow the driver installation wizard instructions.
3. The system will help you to complete the driver installation.

Windows XP 64bit

1. Click on the "**Chipset/Win XP 64bit**" folder and double click the "***.exe**" file.
2. Follow the driver installation wizard instructions.
3. The system will help you to complete the driver installation.

Vista 32 / 64bit

1. Click on the "**Chipset/Vista 32,64bit**" folder and double click the "***.exe**" file.
2. Follow the driver installation wizard instructions.
3. The system will help you to complete the driver installation.

4.2.3 Step 3- Install Intel Graphic Driver

Windows 2000 / Windows XP 32bit

1. Click on the "**VGA/Win 2K,XP 32bit**" folder and double click the "***.exe**" file.
2. Follow the driver installation wizard instructions.
3. The system will help you to complete the driver installation.

Note: *There are several hot keys to allow you to switch between different displays.*

Mode	Key 1	Key 2	Key 3
CRT	CTRL	ALT	F1
LCD	CTRL	ALT	F3
Graphic Control Panel	CTRL	ALT	F12

Press Key1+Key2+Key3 at the same time to change the display mode.

Windows XP 64bit

1. Click on the "**VGA/Win XP 64bit**" folder and double click the "***.exe**" file.
2. Follow the driver installation wizard instructions.
3. The system will help you to complete the driver installation.

Note: *There are several hot keys to allow you to switch between different displays.*

Mode	Key 1	Key 2	Key 3
CRT	CTRL	ALT	F1
LCD	CTRL	ALT	F3
Graphic Control Panel	CTRL	ALT	F12

Press Key1+Key2+Key3 at the same time to change the display mode.

Vista 32bit

1. Click on the "**VGA/Vista 32bit**" folder and double click the "***.exe**" file.
2. Follow the driver installation wizard instructions.
3. The system will help you to complete the driver installation.

Vista 64bit

1. Click on the "**VGA/Vista 64bit**" folder and double click the "***.exe**" file.
2. Follow the driver installation wizard instructions.
3. The system will help you to complete the driver installation.

4.2.4 Step 4- Install Audio Driver

Windows 2000 / Windows XP 32bit

1. Click on the "**Audio/Win 2K, XP 32bit**" folder and double click the "***.exe**" file.
2. Follow the driver installation wizard instructions.
3. The system will help you to complete the driver installation.

Windows XP 64bit

1. Click on the "**Audio/Win XP 64bit**" folder and double click the "***.exe**" file.
2. Follow the driver installation wizard instructions.
3. The system will help you to complete the driver installation.

Vista 32 / 64bit

1. Click on the "**Audio/Vista 32,64bit**" folder and double click the "***.exe**" file.
2. Follow the driver installation wizard instructions.
3. The system will help you to complete the driver installation.

4.2.5 Step 5- Install Intel Ethernet Driver

Windows 2000 / Windows XP 32bit

1. Click on the "**LAN/Win 2K, XP 32bit**" folder and double click the "***.exe**" file.
2. Follow the driver installation wizard instructions.
3. The system will help you to complete the driver installation.

Windows XP 64bit

1. Click on the "**LAN/Win XP 64bit**" folder and double click the "***.exe**" file.
2. Follow the driver installation wizard instructions.
3. The system will help you to complete the driver installation.

Vista 32bit

1. Click on the "**LAN/Vista 32bit**" folder and double click the "***.exe**" file.
2. Follow the driver installation wizard instructions.
3. The system will help you to complete the driver installation.

Vista 64bit

1. Click on the "**LAN/Vista 64bit**" folder and double click the "***.exe**" file.
2. Follow the driver installation wizard instructions.
3. The system will help you to complete the driver installation.

4.2.6 Step 6- Install Intel Storage Driver

Windows 2000,XP 32bit / Windows XP 64bit / Vista 32bit / Vista 64bit

1. Click on the "**Storage**" folder and double click the "***.exe**" file.
2. Follow the driver installation wizard instructions.
3. The system will help you to complete the driver installation.

APPENDIX A

Watchdog Timer

This appendix gives you information about the watchdog timer programming on the SOM-4780 CPU System on Module.

Sections include:

- Watchdog Timer Programming

Appendix A Watchdog Timer

A.1 Programming the Watchdog Timer

Below is a sample of programming code for controlling the Watchdog Timer function.

```
---------------------------------------------------------------------------
Enter the extended function mode, interruptible double-write |
---------------------------------------------------------------------------
MOV DX,2EH
MOV AL,87H
OUT DX,AL
OUT DX,AL
---------------------------------------------------------------------------
Configured logical device 8, configuration register CRF6 |
---------------------------------------------------------------------------
MOV DX,2EH
MOV AL,2BH
OUT DX,AL
MOV DX,2FH
IN AL,DX
AND AL.OEFH;Setbit 4=0 Pin 89=WDTO
OUT DX,AL
MOV DX,2EH
MOV AL,07H; point to Logical Device Number Reg.
OUT DX,AL
MOV DX,2FH
MOV AL,08H; select logical device 8
OUT DX,AL;
MOV DX,2EH
MOV AL,30H;Set watch dog activate or inactivate
OUT DX,AL
MOV DX,2FH
MOV AL,01H; 01:activate 00:inactivate
```

```
OUT DX,AL;
MOV DX,2EH
MOV AL,F5H; Setting counter unit is second
OUT DX,AL
MOV DX,2FH
MOV AL,00H
OUT DX,AL;
MOV DX,2EH
MOV AL,F6H
OUT DX,AL
MOV DX,2FH
MOV AL,05H; Set 5 seconds
OUT DX,AL
;-----------------------------------------
; Exit extended function mode |
;-----------------------------------------
MOV DX,2EH
MOV AL,AAH
OUT DX,AL
```

APPENDIX B

System Assignments

This appendix gives you information about the system resource allocation on the SOM-4780 CPU System on Module.

Sections include:

- System I/O ports
- DMA Channel Assignments
- Interrupt Assignments
- 1st MB Memory Map

Appendix B System Assignments

B.1 System I/O Ports

Table B.1: System I/O Ports

Addr. range (Hex)	Device
000-00F	DMA controller
020-03F	Interrupt controller 1, (master)
040-05F	Timer/counter
060-06F	(keyboard controller)
070-07F	Real-time clock, non-maskable interrupt (NMI) Mark
080-09F	DMA page register
0A0-0BF	Interrupt controller 2 (slave)
0C0-0DF	DMA controller
0F0	Clear math co-processor
0F1	Reset math co-processor
0F8-0FF	Math co-processor
1F0-1F7	Primary IDE channel
200-207	Game I/O
274-279	ISAPNP Read Data Port
2F8-2FF	Serial port 2
378-37F	Parallel printer port 1 (LPT1)
3B0-3DF	Intel 915GM Express Chipset Family Chipset Family
3F0-3F5	FDD Controller
3F8-4D1	Serial port 1
500-51E	Intel 82801 SMbus Controller - 266A
D000-D03F	Network connection
E000-E01F	Intel 82801 USB Host Controller - 2658
E100-E11F	Intel 82801 USB Host Controller - 2659
E200-E21F	Intel 82801 USB Host Controller - 265A
E300-E31F	Intel 82801 USB Host Controller - 265B

B.2 DMA Channel Assignments

Table B.2: DMA Channel Assignments

Channel	Function
0	Available
1	Available
2	Floppy disk (8-bit transfer)
3	Available
4	Cascade for DMA controller 1
5	Available
6	Available
7	Available

B.3 Interrupt Assignments

Table B.3: Interrupt Assignments

Interrupt#	Interrupt source
NMI	Parity error detected
IRQ 0	Interval timer
IRQ 1	Keyboard
IRQ 3	Serial communication port 2
IRQ 4	Serial communication port 1
IRQ 5	Available
IRQ 6	Diskette controller (FDC)
IRQ 7	Available
IRQ 8	Real-time clock
IRQ 9	Microsoft ACPI - compliant System
IRQ 10	Available
IRQ 11	Available
IRQ 12	PS/2 mouse
IRQ 13	INT from co-processor
IRQ 14	Preliminary IDE
IRQ 15	Available
Display controller, Chipset SMBus controller, USB, and Ethernet IRQ is automatically set by the system.	

B.4 1st MB Memory Map

Table B.4: 1st MB Memory Map

Addr. range (Hex)	Device
F000h - FFFFh	System ROM
E000h - EFFFh	Reserved for BIOS boot
D000h - DFFFh	Available when LAN boot disabled
C000h - CFFFh	VGA BIOS
B800h - BFFFh	CGA/EGA/VGA text
B000h - B7FFh	Reserved for graphic mode usage
A000h - AFFFh	EGA/VGA graphics
0000h - 9FFFh	Base memory

APPENDIX C

SDVO Function and FAN Pin Assignment

Appendix C SDVO Function and FAN Pin Assignment

C.1 SDVO Function and FAN Pin Assignment

Table C.1: SDVO Connector

CN1		**SDVO Connector**	
Type		**FPC 40P 0.5mm**	
1	PLTRST# (Platform Reset#)	21	SDVOC_G-
2	SDVO_DAT	22	GND
3	SDVO_CLK	23	SDVOC_R+
4	GND	24	SDVOC_R-
5	SDVO_FLDSTALL+	25	+5 V
6	SDVO_FLDSTALL-	26	SDVOB_INT+
7	+5 V	27	SDVOB_INT-
8	SDVOC_INT+	28	GND
9	SDVOB_INT-	29	SDVOB_CLK+
10	GND	30	SDVOB_CLK-
11	SDVO_TVCLK+	31	+5 V
12	SDVO_TVCLK-	32	SDVOB_B+
13	+5 V	33	SDVOB_B-
14	SDVOC_CLK+	34	GND
15	SDVOC_CLK-	35	SDVOB_G+
16	GND	36	SDVOB_G-
17	SDVOC_B+	37	+5 V
18	SDVOC_B-	38	SDVOB_R+
19	+5V	39	SDVOB_R-
20	SDVOC_G+	40	GND

Testing Method:
Use a SDVO transmission board to LVDS or DVI for evaluation this connector func.

Table C.2: FAN Connector

CN2	**FAN Connector**
Type	**Wafer 3P 2.0mm**
1	FAN_TACHOIN (FAN speed measurement)
2	FAN_PWMOUT (FAN speed controlled by supplied power)
3	GND